Monterey Bay Aquarium
886 Cannery Row
Monterey, CA 93940
831.648.4800

February 12, 2020

Dear members of the California OSHSB:

As one of the largest stakeholders of Technical Diving in the state of California, the Monterey Bay Aquarium fully supports the adoption of the amendments to General Industry Safety Order Sections 6051, 6056, and 6057. With the state's adoption of the Federal Regulations for Commercial Diving 29 CFR 1910 Subpart T in 2017, this amendment will protect the dive regulations that the Cal OSHA regulations (Article 152) have provided for Technical Diving for the past 40 years. Specifically, the Monterey Bay Aquarium fully supports the following proposed regulations:

Adding a new definition to Section 6051, "Zoo and Aquarium Exhibit Diving" and redefining "Technical Diving" to include "Zoo and Aquarium Exhibit Diving."

California is unique in that our regulations go a step further and define various tasks as "*Technical Diving"* that divers perform other than what is defined as commercial diving. In section 6051 of article 152 *Technical Diving* is defined as "All diving other than scientific or commercial diving performed by employees in making observations, measurements, adjustments, underwater photography or special effects and related activities, etc. which require technical expertise and are not an integral part of an ongoing construction, demolition, maintenance, shipbuilding, ship breaking, or ship repair job." This is the crux of our unique California diving regulations because it does what no other standard does; it separates commercial diving from everything else. I urge you to use this "Technical Diving" definition to help the many industries in California that include occupational diving but do not conduct construction or ship work of any kind.

The Monterey Bay Aquarium is one of at least 16 zoos and aquariums in California that follow the current California diving regulations. This industry is one of the largest stakeholders, if not the largest, in the use of these regulations. The zoo and aquarium industry fully support defining the specific tasks that employees conduct in their very specific diving environment. Defining zoo and aquarium exhibit diving as Technical Diving will allow these stakeholders to continue to operate effectively, without undue hardships or unnecessary fiscal impact, with the amendment proposed for sections 6056 and 6057.

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Amendment to subsection 6056(a)(2) to allow Technical Divers the latitude of continuing to use an in-water scuba buddy as the Standby Diver.

Allowing zoo/aquarium dive programs the option of using the in-water buddy system as a means to satisfy the requirement of a Standby Diver (when appropriate) **is the safest option** for scuba divers (not attached to a surface-supplied line or hose but using a Self-Contained Underwater Breathing Apparatus I. E. SCUBA) in our unique environments. The average depth of a zoo/aquarium exhibit is less than 20 feet, and the water in these exhibits has high visibility. Years of training, emergency drills, and exercises in exhibits and associated animal holding tanks have clearly demonstrated that the response time to a scuba diver in trouble is dramatically reduced when the in-water standby diver protocol is used. With this amendment, visual contact between diver(s) and the standby allows for effective communication (**see picture 1**). Without this amendment, a topside standby diver has to be alerted to a diver in distress, enter the water, find the diver, and initiate a rescue, thereby delaying a timely and effective response (**see picture 2 & 3**). Furthermore, without this amendment, in order to continue to use the in-water safety diver (the safest and most effective means of scuba diver safety in an exhibit) institutions will have to add a fourth person to the dive team to act as a topside standby diver. The financial impact of adding a fourth person to a dive team merely to satisfy the federal regulation while continuing to use the safest protocol for the divers will be immense. The Monterey Bay Aquarium conducts over 7,000 dives annually, and over the past 10 years we've conducted over 50,000 dives totaling more than 60,000 hours underwater. Our lost-time accidents over this same 10-year time period is very low; none of which were caused by equipment failure or out-of-gas emergencies. Without this amendment, the Aquarium will be required to add additional employees for all of these hours with no additional diver safety advantage.

Amendment to add the newly proposed section 6056(a)(5) which will allow Hookah diving for Technical Diving only:

Hookah is routinely and widely used in zoo/aquarium exhibits safely and efficiently for cleaning and care of the exhibit habitat and as a means of providing targeted animal care. They are used in small, shallow exhibits that typically do not allow for the use of traditional scuba cylinders. The Monterey Bay Aquarium safely conducts approximately 100 hookah dives annually.

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The amendment also adds restrictions and requirements to hookah diving to ensure safe use. These additions include a depth limit of 30 feet (less than 15psi over-bottom pressure or OBP), a requirement of a diver worn harness (congruent with surface-supplied dive requirements), a redundant breathing source requirement (as with surface-supplied diving), and a quick-release snap shackle mechanism that must be used to attach the airline umbilical to the diver harness (as with surface-supplied.) The Monterey Bay Aquarium fully supports these proposed additions and restrictions *and* currently employs these proposed restrictions and additions to its current hookah diving operations protocol.

Counterarguments to the Federal Commercial Diving Regulations restriction of the use of hookah as a mode of diving:

As per the 2011 Federal OSHA Directive CPL 02-00-151 (effective date June 13, 2011) for CFR Part 1910, subpart T, Appendix A, Question 7 the reasons given for hookah not to be approved for commercial diving are as follows:

1. "such rigs prohibit diver-to-topside communications, which is a requirement for all surface-supplied diving operations"

Counter Argument by the Monterey Bay Aquarium:

Divers utilizing hookah in zoo and aquarium exhibits use the same diver-topside communication protocol as the **federally approved** line-tended scuba diver regulation. The hookah diver has a clear view of their pressure gauge, just like a federally approved line-tended scuba diver. The only difference between a hookah diver and the **federally approved** line-tended scuba diver is that the identical air source for the hookah diver is supplied from the surface. Furthermore, the unique nature and design of zoo/aquarium exhibits often means the hookah diver and topside standby diver have a clear line of sight to each other, which may not be the case if the surface supplied (compressors, air banks, surface-supplied mobile carts, etc.) or line-tended scuba diver modality is required and employed (**see picture 4**).

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2. "In a SCUBA regulator assembly, the first-stage SCUBA regulator has a mechanism that compensates for the ambient water pressure and maintains a constant pressure, in a specified range, to the second-stage regulator. Without the first-stage SCUBA regulator, as in the case with a hookah rig as described, the inlet air pressure to the second-stage regulator is not automatically compensated to maintain a constant over-bottom pressure (psi-ob); therefore, as the diver goes deeper, the air flow from the second-stage regulator decreases. Eventually, as the diver goes deeper, the diver will receive little or no air."

Counter Argument by the Monterey Bay Aquarium:

Modern day first stage regulators function with a service I.P. (Intermediate Pressure) of 130psi – 150psi. By limiting the maximum depth allowed for hookah diving to 30 feet, the maximum over-bottom pressure needed to overcome is less than 15psi. All second stage regulators are designed to function easily with 100 psi or more. These added hookah diving requirements and restrictions to Technical Diving operations ensure and maintain the safe and effective use of hookah systems.

Additional Hookah notes:

- The American Academy of Underwater Sciences (AAUS) allows hookah diving with no additional restrictions or requirements.
- The American Academy of Underwater Sciences allows hookah diving in a zoo/aquarium environment if conducting scientific diving.
- Hookah equipment is less complex and easier to use than surface supplied equipment (**see picture 5**); it is less costly and at least as safe (if not safer) in zoo/aquarium environments.

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Safe Diving Data for Use of These Amendments to Sections 6056 and 6057:

The California zoo and aquarium industry can provide years of diving data regarding the safe use of the proposed amendments to sections 6056 and 6057 in our specialized environments. The Monterey Bay Aquarium alone has over 160 people who dive as part of their job. In the year 2019 we had zero pressure or dive equipment related incidents, injuries, or lost-time accidents. The aquarium and zoo industry as a whole in California are made up of dive programs, both large and small, that have similar safety records.

In closing, the Monterey Bay Aquarium fully supports and encourages the California OSHSB to approve these amendments. Without the approval of these amendments, the dive operations for your largest stakeholder, the zoo and aquarium industry, will fundamentally change and become less safe for our employees while imposing an undue financial hardship for these institutions, with no added safety benefit. We encourage you to vote "Yes" for these amendments.

Respectfully submitted,

George Z. Peterson
Director of Dive Programs
Diving Control Board Chairman
Monterey Bay Aquarium

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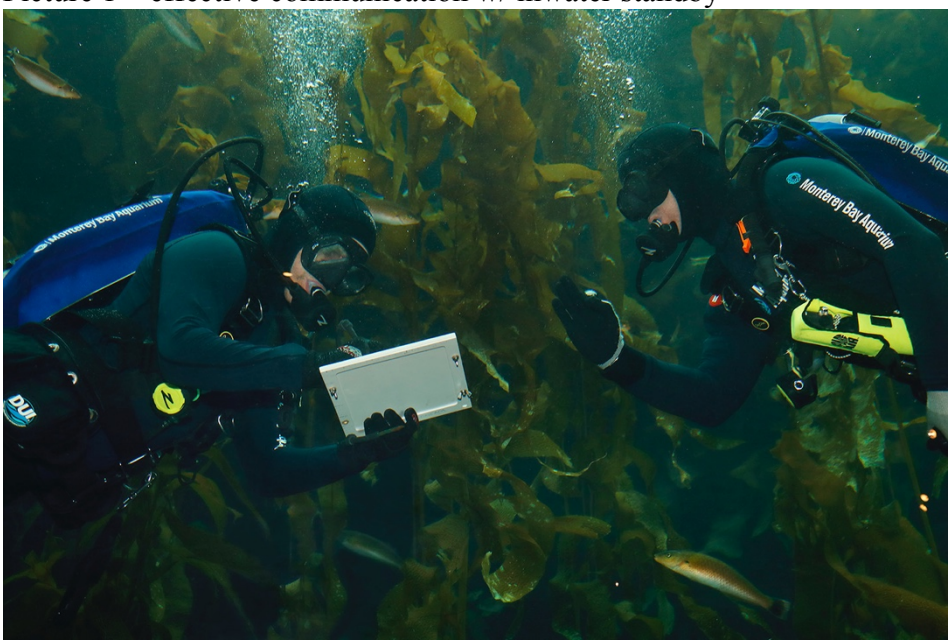
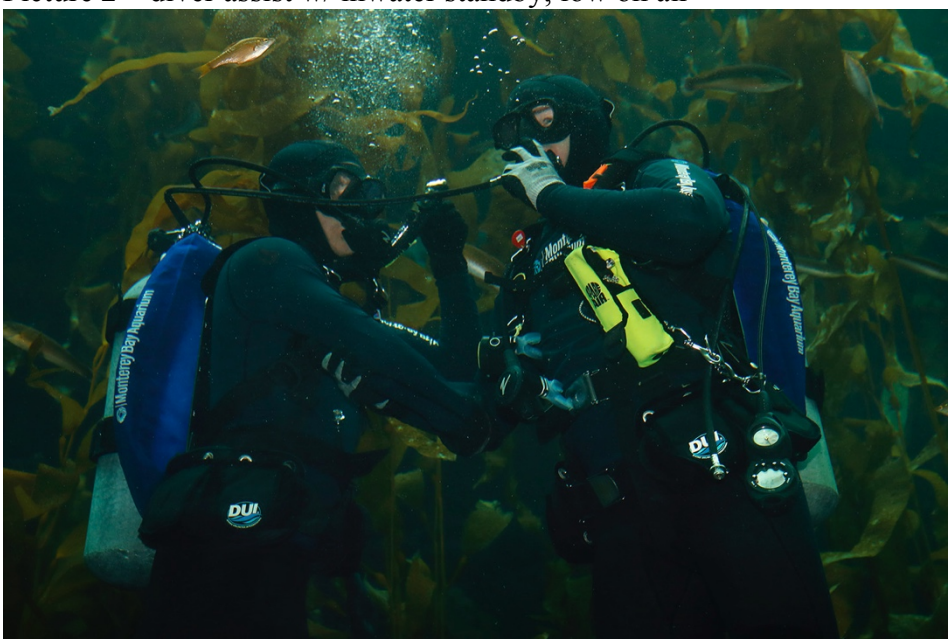
Picture 1 – effective communication w/ inwater standby



Picture 2 – diver assist w/ inwater standby, low on air



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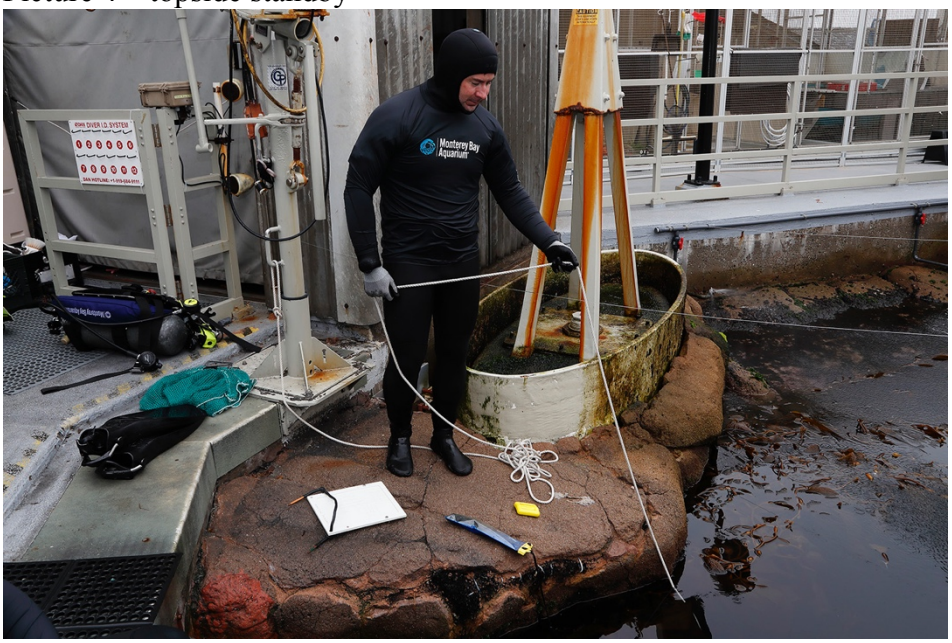
Picture 3 – unconscious diver ascent w/ inwater standby

Picture 4 – topside standby



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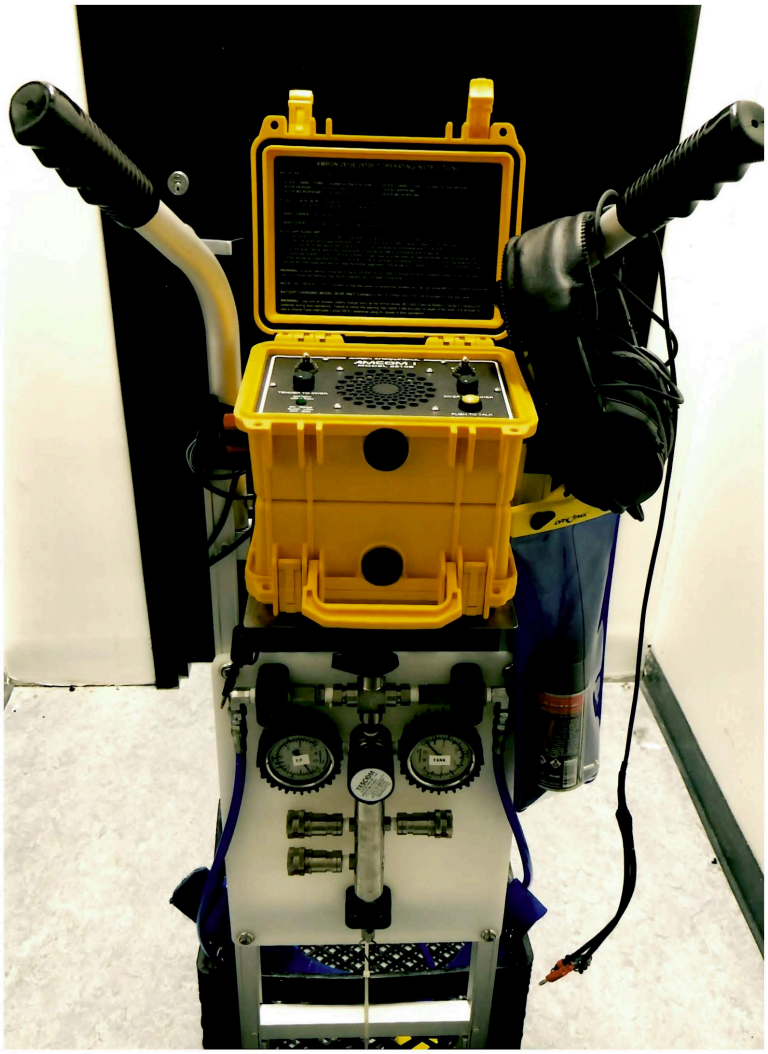
Picture 5 – surface supplied cart



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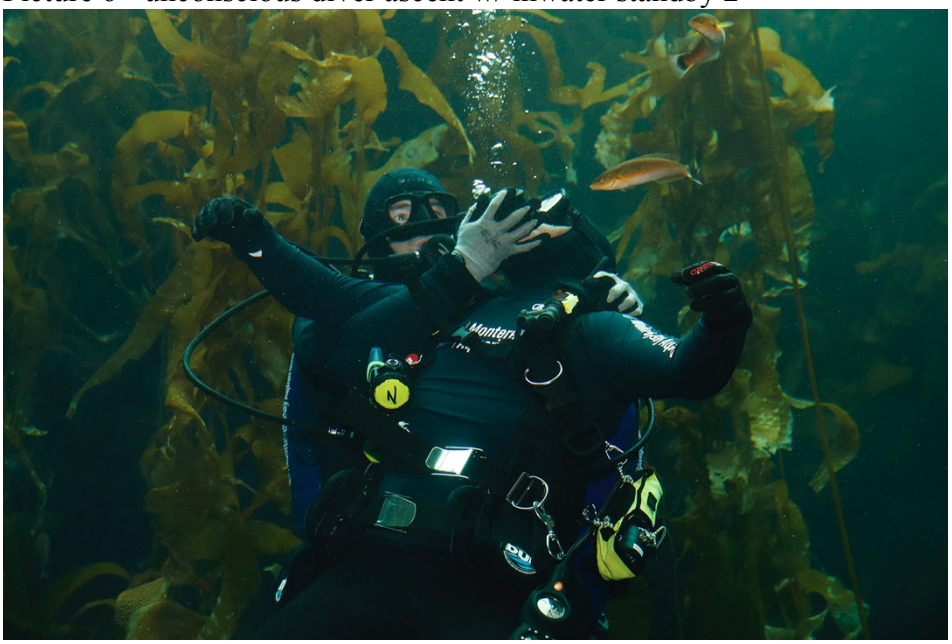
Picture 6 - unconscious diver ascent w/ inwater standby 2



Picture 7 - unconscious diver ascent w/ topside standby

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Picture 8 - entanglement w/ inwater assist

Picture 9 - entanglement w/ topside assist